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AUTHOR Quay, Lorene C.; And Others
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ABSTRACT

Both concurrent and predictive validity of two developmental instruments, each purporting to measure the same five developmental dimensions, were compared. The Developmental Profile II (DPII), a commercial test, was administered to the same children when they were in prekindergarten and first grade. The initial samples were 91 and 267 prekindergarten students. The Developmental Rating Scale (DRS), a simple teacher rating scale constructed for this research, was administered to these children when they were in kindergarten. Data on promotion and referral for special services were collected at the end of kindergarten and first grade. Regression analyses using subscale scores as the independent variables and promotion and referral as the dependent variables indicated that some DRS subscales are better predictors of promotion and referral than DPII subscales. This finding suggests that the use of a simple device instead of a time-consuming and expensive commercial test may enhance teachers' ability to describe and predict children's success and problems. Underlying dimensionality was studied using a factor analysis on the subscale scores obtained on all administrations of the two instruments. The factor analysis yielded one factor for all the subscales to each instrument and a different factor for each instrument. This indicated that each test measures a global dimension, not five separate dimensions or skills. (Contains 8 tables and 14 references.) (Author/SLD)

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Running Head: CONCURRENT AND PREDICTIVE VALIDITY

The Developmental Rating Scale: A Teacher-Friendly Alternative to Commercial Assessment Devices

Lorene C. Quay, Marsha Kaufman-McMurrain,

Donald C. Steele, Darlene A. Minore, and Lacey Cook

Georgia State University

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Abstract

Both concurrent and predictive validity of two developmental instruments, each purporting to measure the same five developmental dimensions, were compared. The Developmental Profile II (DPII), a commercial test, was administered to the same children when they were in prekindergarten and first grade. The Developmental Rating Scale (DRS), a simple teacher rating scale constructed for this research, was administered to these children when they were in kindergarten. Data on promotion and referral for special services were collected at the end of kindergarten and first grade. Regression analyses using subscale scores as the independent variables and promotion and referral as the dependent variables indicated that some DRS subscales are better predictors of promotion and referral than DPII subscales. This finding suggests that the use of a simple device instead of a time-consuming and expensive commercial test may enhance teachers' ability to describe and predict children's success and problems

Underlying dimensionality was studied using a factor analysis on the subscale scores obtained on all administrations of the two instruments. The factor analysis yielded one factor for all the subscales on each instrument and a different factor for each instrument. This indicated that each test measures a global dimension, not five separate dimensions or skills.

The Concurrent and Predictive Validity of Two Developmental Instruments for Assessing Success and Problems in Kindergarten and First Grade

Researchers and practitioners rely on developmental assessment instruments to describe young children's developmental characteristics and progress. These instruments have been used to assess the outcomes of various types of intervention (e. g., Holmes, Britain, Simpson, and Hassanein, 1987), to inform instruction (Kagan, 1989), to group children for teaching (Bidder, Hewitt, & Gray, 1983), and to identify children who have developmental problems or are at risk for school failure (Goldman and Gilbert, 1992). Several comparisons of the effectiveness of different developmental assessment instruments generally indicate that no single instrument is superior for all purposes (Schraeder, 1993; Campbell & Ramey, 1990; Chew & Lang, 1990; Glascoe & Byrne, 1993).

Because most decisions based on developmental assessment have implications for the tested children's future, it is important that instruments have predictive as well as concurrent validity. Overall, research results on predictive validity have been mixed. In studying the effectiveness of developmental tests for predicting later attainment, Chew and Lang (1990) found that two different developmental tests administered in kindergarten predicted kindergarten and first-grade achievement. However, based on a review of research, Barnett, Macmann, and Carey (1992) criticized the validity of preschool tests for predicting future performance. Rubin and Balow (1979) also questioned the predictive validity of preschool instruments. They found socioeconomic status to be a better predictor of achievement than developmental assessment.

Research results are also mixed concerning the usefulness of developmental assessment instruments for identifying problems. Meisels, Henderson, and Kiaw (1993) concluded that one instrument (the Early Screening Inventory) distinguishes between children who are and are not

referred. However, studying a battery of tests, Goldman and Gilbert (1992) found that developmental test scores had very low correlations with clinicians' and teachers' ratings of "at risk" kindergartners. Barnett, Macmann, and Carey (1992) suggest that early intervention decisions are not well served by traditional developmental assessments.

A number of additional problems have been described. Barnett, Macmann, and Carey (1992) criticized the assumption that these tests generally have a number of subscales which purport to measure different areas of development. They found that correlations among subscales tend to be higher within a particular test than across developmental areas when more than one test is used. From this, they concluded that these instruments typically function as global measures, not profiles of discrete skills, and that inferences associated with profile patterns are more likely to be unique to a particular instrument rather than to the child being tested. In addition, Quay (1995) noted that these instruments are cumbersome to administer and score and that alternative developmental assessment procedures are needed.

Valid, unobtrusive, and efficient developmental assessment methods are essential for both research and application. The purpose of the present research was to evaluate the concurrent and predictive validity of two developmental assessment methods. Their ability to accurately describe developmental progress, identify current problems, predict developmental attainment, and predict developmental problems was studied. One instrument, the Developmental Profile II (DPII) (Alpern, Boll, & Shearer, 1986) is a commercial test which can be administered by means of a teacher interview. Although this method is less cumbersome than directly testing children, a great deal of time is still required for administration and scoring. In a longitudinal study this instrument was administered in prekindergarten and first grade.

The other instrument, the Developmental Rating Scale, consists of a set of simple teacher rating subscales devised for a large evaluation of a prekindergarten program. This instrument was administered in kindergarten.

Method

Subjects

Prekindergarten. The initial subjects were two groups of children who attended a state-supported prekindergarten for low-income 4-year-olds. The first group of 91 children attended prekindergarten in 1992-93. This group was followed for three years and was in first grade at the time of the study. The second group of 267 attended prekindergarten in 1993-94. This group was followed for two years and was in kindergarten at the time of the study. While the children were in prekindergarten, developmental data were obtained by means of the teacher interview method of administering the DPII. To control for teacher bias and fatigue, the children were randomly selected from the classrooms of 83 different teachers.

Kindergarten. When the children in each group were 5 years old (1993-94 for Group 1 and 1994-95 for Group 2), the 91 Group 1 children and the 267 Group 2 children were dispersed among 200 different public kindergarten classrooms. From the same classrooms, additional children were randomly selected to increase the number in group 1 to 195 and in Group 2 to 534. Thus, kindergarten data were obtained for a total of 729 children. During kindergarten the 200 teachers used the DRS to assess the children's development. At the end of the year each child's promotion status was obtained. Promotion status was described as retained, promoted, or "placed." "Placed" was used for teachers to indicate that the child did not meet the academic criteria for promotion but was advanced to the next grade because of parental pressure, the need to obtain special services that

were not available until the child entered first grade, or, in a few instances, school policy against retention. In this study, "placed" was treated as retained. Data were also obtained on whether each child had been referred for a problem.

First Grade. When the 195 Group 1 children reached first grade in the 1994-95 school year, their 65 teachers assessed their development using the DPII (Group 2 had not reached first grade in 1994-95.) Teachers also provided data on referrals and promotion status (retained, promoted, "placed") for each child.

Assessment Instruments

The Developmental Profile II (DPII). The DPII is a commercial instrument having five subscales which measure the following developmental areas: academic, communicative, physical, self help, and social. Each subscale yields a developmental age score, the level on which a typical child of a particular chronological age is functioning, and a differential score, the difference between the developmental age score and the child's actual chronological age. The differential score indicates the number of months a child is advanced or delayed. Differential scores were used in this study because they controlled for chronological age. These scores were transformed to percentiles to assure that they were on the same scale for each administration.

Designed for use with children from birth to 9.5 years of age, the DPII can be administered in three different ways: direct individual testing of the child, parent interview, and teacher interview. Because of recent concerns among early childhood advocates about the intrusiveness of direct testing and because of the inefficiency of individually testing each child, the teacher interview method of administration was used. Even with this method each test requires from 20 to 45 minutes to administer and score. A number of validation studies reported in the test manual indicate that

correlations between this test and the Stanford-Binet range from .63 to .85 when the teacher interview procedure is used. Test-retest reliability computed on a group of 35 teachers yielded an agreement of 89%. Lawhon (1977) reported that internal consistency coefficients for the 5 subscales ranged from .78 to .83.

The Developmental Rating Scale (DRS). The DRS is a simple teacher rating scale constructed for this research. It consists of five one-page teacher rating subscaless, one for each of the developmental areas measured by the DPII: physical, self-help, social, academic, and communicative development. Teachers were given examples of behaviors in each area. Then they were directed to list the names of all children in the class and to give each child a rating from 1 (lowest) to 8 (highest) comparing him or her to all the other children in the class. The DRS was forced choice in that the teacher was required to indicate the lowest child in each developmental area by assigning him or her the lowest number, 1, and the highest child by assigning him or her the highest number, 8. Teachers were required to use each number, that is, to give at least one child each rating between 1 and 8. This procedure assured that teachers actually used all eight rating categories.

A determination of the test-retest reliability of the DRS was made prior to its use in this study by administering it to 88 elementary school teachers on two separate occasions, two weeks apart. The scores on the two administrations of each subscale were correlated, yielding correlations ranging from .86 to .92 for the five subscales. These correlations indicate that the subscales are highly reliable.

Results

Kindergarten

Concurrent Assessment. To ascertain whether the DRS was valid for measuring current developmental progress and identifying problems, two multiple regression analyses were computed.

For both concurrent kindergarten analyses the independent variables were all five subscales of the DRS. For the first analysis the dependent variable was promotion from kindergarten. For the second analysis the dependent variable was referral for special services. The subjects for these analyses consisted of a combination of the two groups of children that had attended prekindergarten in consecutive years and the additional children selected in kindergarten. The total number was 729.

The results of the first analysis appears in Table 1. This table indicates that the kindergarten DRS academic score is the strongest contributor to the explanation of kindergarten promotion. DRS self help is the only additional contributor.

The results of the second analysis appear in Table 2. The best contributor to explaining kindergarten referrals is DRS self help. It is closely followed by DRS communication and DRS academic scores. For this analysis, there appears, after rounding, to be no difference between the correlations obtained in the last two steps. However, SPSS stepwise regression indicates that the inclusion of these independent variables gives the best model for explaining kindergarten referral.

Table 3 presents the correlation matrix for all the concurrent kindergarten variables. The five DRS subscales were highly correlated with each other. This shared variance accounts for the finding that only a few subscales were significant contributors to promotion and referral.

Prediction from Prekindergarten to Kindergarten. To ascertain whether the DPII was effective for predicting developmental success and developmental problems, two multiple regression analyses were computed. The two groups of children that had attended prekindergarten in consecutive years were the subjects in these analyses. The additional children selected in kindergarten were not used, since these analyses concerned prediction based on the DPII used in prekindergarten. The total number of children used for prediction was 358. For both analyses, the independent variables were

prekindergarten DPII scores on the five subscales. In the first analysis the dependent variable was kindergarten promotion one year after test administration. In the second analysis the dependent variable was kindergarten referral the year after test administration.

The first analysis yielded one significant predictor of kindergarten promotion, the DPII Social score, $R = .13$, $\beta = .13$, $p < .05$. Although this correlation was statistically significant, it is so low that it has little practical or theoretical significance. In the second analysis the dependent variable was kindergarten referrals. No prekindergarten DPII scores predicted kindergarten referrals.

Table 4 presents the correlation matrix for all prekindergarten DPII scores and kindergarten promotion and referral. All prekindergarten DPII subscales are correlated with each other. However, their correlations with first-grade promotion and referral were too low to have any theoretical or practical significance.

First Grade

Concurrent Assessment. To ascertain whether the DPII was valid for assessing current developmental progress and identifying current problems in the first grade, two multiple regression analyses were computed. For both, the independent variables were the five subscales of the DPII administered in the first grade. The dependent variable in the first analysis was promotion; in the second analysis it was referral for special services.

Because Group 2 children had not yet reached first grade, the subjects of the analyses were Group 1 children who had attended prekindergarten and the additional children selected when this group was in kindergarten. The number of children was 195.

Only one variable contributed to the explanation of promotion from first grade. That was the DPII Academic score, $R = .36$, $\beta = +.36$, $p < .001$. The same variable, DPII Academic, was also the only one to contribute to the explanation of referral, $R = .31$, $\beta = -.31$, $p < .001$.

Table 5 presents the correlation matrix for all concurrent first-grade variables. All DPII subscales were highly correlated with each other, and their shared variance made it unlikely that more than one would significantly contribute to the explanation of first grade referrals and promotions.

Prediction from Prekindergarten and Kindergarten to First Grade. To ascertain whether DPII and DRS scores were valid for predicting first grade success and problems, two sets of multiple regression analyses were computed. The 91 group 1 children who attended prekindergarten were the subjects of these analyses. (Group 2 children had not reached first grade.) Because this was a prediction study, only the children who had been tested in prekindergarten, not the additional ones selected in kindergarten, were used. For the first set of analyses the independent variables were scores on the five subscales of the DPII in prekindergarten and scores on the five subscales of the DRS in kindergarten. In one analysis the dependent variable was promotion from first grade. In the other analysis the dependent variable was first grade referral. The only significant predictor of first grade promotion was the kindergarten DRS Academic score, $R = .53$, $\beta = .53$, $p < .001$. As shown in Table 6, kindergarten DRS communication and prekindergarten DPII self help were significant predictors of first-grade referrals.

Because the DRS and DPII had shared variance and because only the DRS predicted first grade promotion and referral, an additional set of regression analyses were performed to ascertain whether the DPII scores from prekindergarten would predict first-grade success if the DRS scores were not in the analysis. For these analyses the independent variables were the scores on the five

subscales of the prekindergarten DPII. The dependent variables were promotion in one analysis and referral in the other. The prekindergarten DPII academic score had a low but significant correlation with first-grade promotion, $R = .27$, $\beta = .27$, $p < .05$. The prekindergarten DPII communication score had a slightly higher correlation with first grade referral, $R = .32$, $\beta = -.32$, $p < .01$.

Factor Analysis

An assumption underlying both instruments is that the subscales measure five different dimensions of development. To test this assumption, two factor analyses were performed. The first includes three sets of scores: the DPII at age 4, the DRS at age 5, and the DPII at age 6. A total of 91 children, those who had attended prekindergarten and had reached first grade, were subjects of this analysis. Scores from all 15 subscales were analyzed using a principal component extraction followed by a varimax rotation (to insure orthogonality). The subscales from each instrument loaded on a single factor. Thus, the analysis yielded three factors, one for each test. This finding suggests that each test measures an underlying global dimension, not five different dimensions of development. The results of the factor analysis are presented in Table 7. These results also explain the finding that only a few subscales from each test battery predict promotion and referral.

The second analysis was a partial replication of the first, using the sample consisting of the two groups that had attended prekindergarten and kindergarten, a total of 358 children. However, this analysis includes only two sets of scores: the DPII at age 4 and the DRS at age 5. Using the same procedures that were used in the first analysis, two factors were found. The results are shown in Table 8. The subscale scores of the DRS loaded on the first factor and the subscale scores of the DPII loaded on the second. The findings of the two analyses support the conclusion that each of these tests measures one global dimension, not five different dimensions.

Discussion

Two DRS subscale scores obtained in kindergarten contributed to the explanation of kindergarten promotion; and three DRS subscale scores contributed to the explanation of kindergarten referrals. For promotion the academic score was the major contributor, but the self-help score made a small additional contribution. It might be expected that the behaviors underlying the academic score would also be those on which promotion decisions are based.

The self-help score was the major contributor to the explanation of kindergarten referrals. For such young children, it might be expected that self-help skillfulness would be an important characteristic on which to base referral decisions.

The DPII scores obtained in prekindergarten were not valid for predicting kindergarten promotion or referral. Thus, this instrument does not measure in 4-year-olds the characteristics that are considered important for making these determinations when the children are 5-year-olds.

For assessing current progress in first grade, the DPII academic score obtained for the 6-year-olds had low, but significant, correlations with both promotion and referrals. For predicting first grade promotion and referral, scores from both the prekindergarten DPII and the kindergarten DRS were used. The only significant predictor of promotion was the DRS academic score obtained in kindergarten. Predictors of first-grade referrals were DRS communication and DRS self-help scores obtained in kindergarten. When only prekindergarten DPII scores were used as predictors, the correlations, though significant, were too low to have merit. Suggesting that the DRS was superior to the DPII was the finding that DRS scores obtained in kindergarten had higher correlations with first grade promotion and referral than DPII scores obtained in the first grade itself.

The measures that best predicted first grade promotions and referrals came from the kindergarten DRS. This finding could be interpreted to mean that the measure taken closer in time to the criterion is superior. However, this interpretation is moderated by the finding that the DRS academic score in kindergarten had a higher correlation with first-grade promotion and referral than did any first-grade DPII score. These results might be interpreted to mean that kindergarten teachers are better at analyzing and predicting children's academic progress when using a simple rating scale than when using at least one commercial test, the DPII..

The correlations among all subscales of each instrument were very high. The high common variance among the subscales meant that only a few of them could contribute to the explanation and prediction of school progress. Factor analyses yielding one factor for all the subscales on each instrument and a different factor for each instrument indicated that each test measures a global dimension, not five separate dimensions or skills. The findings of Barnett, Macmann, and Carey (1992), even though they used a different battery of tests, were identical in indicating a single dimension for developmental tests. With evidence of this nature from two separate studies of different developmental assessment instruments, it seems safe to conclude that testing of many separate areas of development is time consuming, inefficient, and unnecessary.

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Table 1

Summary of Hierarchical Regression Analysis for DRS Variables

Explaining Kindergarten Promotion (N=729)

Variables	B	SE B	β
Academic	0.05	0.01	.31**
Self-Help	0.03	0.01	.19**

Note. R = .45 for Step 1; ΔR= .02 for Step 2.

* $p < .05$

** $p < .01$

Table 2

Summary of Hierarchical Regression Analysis for DRS Variables Explaining Kindergarten Referral (N=729)

Variables	B	SE B	β
Self-Help	-0.03	0.01	-.16**
Communication	-0.03	0.01	-.12*
Academic	-0.03	0.01	-.12*

Note. $R = .34$ for Step 1; $\Delta R = .02$ for Step 2; $\Delta R = .002$ for Step 3.

* $p < .05$

** $p < .01$

Table 3

Correlation Matrix for Kindergarten Developmental Rating Scores (DRS), First Grade Promotion, and First Grade Referral

Correlation Coefficients	Academic	Communication	Physical	Self-Help	Social	Promotion
Communication	.77**					
Physical	.61**	.60**				
Self-Help	.74**	.71**	.70**			
Social	.60**	.63**	.56**	.67**		
Promotion	.45**	.41**	.34**	.41**	.32**	
Referral	-.32**	-.32**	-.27**	-.33**	-.28**	-.31**

* $p < .05$

** $p < .01$

Table 4

Correlation Matrix for Kindergarten Developmental Profile II (DPII) Scores, Kindergarten Promotion, and Kindergarten Referral

Correlation Coefficients	Academic	Communication	Physical	Self-Help	Social	Promotion
Communication	.64**					
Physical	.59**	.62**				
Self-Help	.55**	.50**	.56**			
Social	.60**	.52**	.57**	.62**		
Promotion	.11*	.10	.10	.03	.12*	
Referral	-.10	-.03	-.01	-.08	-.07	-.23**

* $p < .05$

** $p < .01$

Table 5

Correlation Matrix for First Grade Developmental Profile II (DPII) Scores, First Grade Promotion and First Grade Referral

Correlation Coefficients	Academic	Communication	Physical	Self-Help	Social	Promotion
Communication	.76**					
Physical	.62**	.57**				
Self-Help	.59**	.59**	.58**			
Social	.54**	.67**	.55**	.67**		
Promotion	.36**	.36**	.24**	.16*	.28**	
Referral	-.31**	-.29**	-.29**	-.10	-.25**	-.28**

* $p < .05$

** $p < .01$

Table 6

Summary of Hierarchical Regression Analysis for DRS and DPII Variables Predicting First Grade Referral (N=91)

Variables	B	SE B	β
DRS COMMUNICATION	-0.73	0.27	.28**
DPII (PRE-K) SELF HELP	-0.59	0.29	.21**

Note. R = .46 for Step 1; ΔR = .07 for Step 2.

* $p < .05$

** $p < .01$

Table 7

Factor Loadings for the Prekindergarten DPII (1993), the Kindergarten DRS (1994), and the First Grade DPII (1995) Subscale Scores

Subscales	Factor 1 Loadings	Factor 2 Loadings	Factor 3 Loadings
Self-Help 1995	.87	.10	.00
Communication 1995	.84	.30	.07
Physical 1995	.81	.16	.02
Social 1995	.81	.28	.14
Academic 1995	.80	.18	.10
Self-Help 1994	.33	.82	.21
Physical 1994	.19	.81	.15
Communication 1994	.32	.80	.25
Academic 1994	.34	.80	.27
Social 1994	.05	.72	.14
Social 1993	.09	.23	.85
Self-Help 1993	.03	.12	.85
Academic 1993	.16	.29	.82
Physical 1993	-.06	.03	.82
Communication 1993	.11	.29	.73
Percentage of variance explained	44.4	19.1	9.9

Table 8

Factor Loadings for the Prekindergarten DPII (1994) and the Kindergarten DRS (1995) Subscale Scores

Subscales	Factor 1 Loadings	Factor 2 Loadings
Self-Help 1995	.89	.09
Communication 1995	.86	.15
Academic 1995	.86	.12
Physical 1995	.82	.02
Social 1995	.77	.09
Physical 1994	.04	.83
Academic 1994	.24	.81
Social 1994	.11	.81
Self-Help 1994	-.01	.80
Communication 1994	.11	.80
Percentage of variance explained	42.8	26.6